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Removing dietary liquid calories prevents accelerated body mass index increase

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Abstract

de Ruyter JC, Olthof MR, Seidell JC, Katan MB. A trial of sugar-free or sugar-sweetened beverages and body weight in children. *N Engl J Med* 2012;367:1397-406.

Question

Among elementary-age children, what is the therapeutic efficacy of drinking sugar-free as opposed to artificially-sweetened beverages on body weight?

Design

Randomized controlled trial.

Setting

8 elementary schools near Amsterdam, the Netherlands.

Participants

641, primarily normal-weight children, 4 years 10 months to 11 years 11 months of age, who typically drank sugar-sweetened beverages.

Intervention

One 8 ounce can per day of sugar-sweetened or artificially-sweetened beverages over an 18-month period.

Outcomes

The primary outcome was the body-mass index (BMI) z score (expressed as the number of standard deviations by which the BMI differed from the mean for a child's age and sex in the Netherlands). Prespecified secondary outcomes were waist:height, the sum of the four skinfold-thickness measurements, and fat mass determined by means of electrical impedance.

The findings and conclusions in this commentary are those of the author and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Main Results

The z score for BMI increased on average by 0.02 SDs in the sugar-free group and by 0.15 SDs in the sugar group; the 95% CI of the difference was -0.21 to -0.05. Weight increased by 6.35 kg in the sugar-free group compared with 7.37 kg in the sugar group (95% CI for the difference, -1.54 to -0.48). The skinfold-thickness measurements, waist:height, and fat mass also increased significantly less in the sugar-free group. Adverse events were minor. When we combined measurements at 18 months in 136 children who had discontinued the study with those in 477 children who completed the study, the BMI z score increased by 0.06 SDs in the sugar-free group and by 0.12 SDs in the sugar group ($P=.06$).

Conclusions

Masked replacement of sugar-containing beverages with noncaloric beverages reduced weight gain and fat accumulation in normal-weight children.

Commentary

There is a high prevalence of obesity among children¹ and it has been demonstrated that sugar-sweetened beverage intake is associated with weight gain.² The 18-month randomized controlled, double-blind study reported by de Ruyter et al examined effects of noncaloric beverage intake (sweetened with artificial sweeteners) on weight gain among healthy Dutch children as compared with a group receiving a beverage sweetened with sucrose. Children with habitual intake of 250 mL/day of sugar-sweetened beverages on at least 3 out of 5 school days were included in the study. This study has several strengths: it was double-blind and, in contrast to most randomized trials on sugar-sweetened beverages, had a relatively long follow-up period and a large sample size. Although 26% of participants did not complete the study, the authors used imputation techniques to account for loss to follow up and found the results were similar. A previous study by Tate et al found that, among overweight and obese adults, replacement of caloric with non-caloric beverages led to a weight loss of 2.5%, and that replacement of sugar-sweetened beverages with water led to weight loss of 2.03%.³ One unresolved issue is that the long-term effects of and calorie compensation for artificially sweetened beverage intake are still unknown.^{4,5} Future randomized studies should consider using plain water instead of artificially-sweetened beverages because the effect on BMI z scores may vary significantly from those reported in this study.

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